

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference GB/13234.44	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/CA2004/002184	International filing date (day/month/year) 22 December 2004 (22-12-2004)	Priority date (day/month/year) 23 December 2003 (23-12-2003)	
International Patent Classification (IPC) or national classification and IPC IPC: C08L 63/00 (2006.01), C08K 3/34 (2006.01), C01B 33/44 (2006.01)			
Applicant VALORBEC SOCIETE EN COMMANDITE ET AL			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>8</u> sheets, as follows: <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. 1 and the Supplemental Box. b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).			
4. This report contains indications relating to the following items: <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input checked="" type="checkbox"/> Box No. VII Certain defects in the international application <input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application			
Date of submission of the demand 02 August 2005 (02-08-2005)		Date of completion of this report 10 April 2006 (10-04-2006)	
Name and mailing address of the IPEA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001(819)953-2476		Authorized officer Tony F. Neppel (819) 997-2890	

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CA2004/002184

Box No. I Basis of the report

1. With regard to the language, this report is based on:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:
- | | | | |
|--------------------------------------------|------------------|-------------------------------|-------------------------------|
| <input checked="" type="checkbox"/> pages | 1 - 5 and 7 - 27 | | as originally filed/furnished |
| <input checked="" type="checkbox"/> pages* | 6 | received by this Authority on | 2 August 2005 |
| <input type="checkbox"/> pages* | | received by this Authority on | |
- ☒ the claims:
- | | | | |
|--------------------------------------------|---------|-----------------------------------------------------------|-------------------------------|
| <input type="checkbox"/> pages | | | as originally filed/furnished |
| <input type="checkbox"/> pages* | | as amended (together with any statement) under Article 19 | |
| <input checked="" type="checkbox"/> pages* | 28 - 32 | received by this Authority on | 2 August 2005 |
| <input type="checkbox"/> pages* | | received by this Authority on | |
- ☒ the drawings:
- | | | | |
|--------------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <input checked="" type="checkbox"/> pages | 1/31 - 7/31 and 10/31 - 31/31 | | as originally filed/furnished |
| <input checked="" type="checkbox"/> pages* | 8/31 - 9/31 | received by this Authority on | 2 August 2005 |
| <input type="checkbox"/> pages* | | received by this Authority on | |
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CA2004/002184

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1 to 25	YES
	Claims	none	NO
Inventive step (IS)	Claims	1 to 25	YES
	Claims	none	NO
Industrial applicability (IA)	Claims	1 to 25	YES
	Claims	none	NO

2. Citations and explanations (Rule 70.7)

Reference is made to the documents which were cited in the Written Opinion (WO) of the International Searching Authority, namely:

D1 LIU, WEIPING et al, 48th International SAMPE Symposium, 11-15 May 2003, Book 1, pages 142-154

D2 US 6107387 A (KAYLO, ALAN et al) 22 Aug 2000

D3 US 2003/0039812 (TSAI, TSUNG-YEN et al) 27 Feb. 2003

D4 EP 1038913 A1 (AMCOL INTERNATIONAL CORP.) 27 Sep. 2003

D5 LEBARON, PETER C. et al, Applied Clay Science 1999, Vol. 15, pages 11-29

D6 GAM, K. T. et al, Polymer Engineering and Science, October 2003, Vol. 43, pages 1635-1645

Novelty and Inventive Step - Articles 33(2) and 33(3) PCT

Under Article 34 PCT, Applicant amended claims 1 and 20 so substantially that the subject matter of these claims, as currently on file, does not appear to be anticipated or rendered obvious by the prior-art documents cited in the WO (D1 to D6). In particular, Applicant inserted into claim 1 detailed conditions under which the clay particles are dispersed in the solution prepared in step (a), before the dispersed solution is mixed with a pristine epoxy. Likewise, claim 20, as amended, outlines how the claimed epoxy composition is prepared, and states that this composition contains nano-dimensional clay particles which are homogeneously distributed in the epoxy matrix. As a result of these amendments, current claims 1 and 20 do not seem to include methods and epoxy compositions disclosed in D1. Consequently, the lack-of-novelty objection raised in the WO does not apply to claims 1 and 20 any longer.

In addition, documents D1 to D6, as taken alone or in combination, do not appear to motivate a skilled person to develop a method within the scope of current claim 1, or to prepare an epoxy composition encompassed by current claim 20. For instance, the high pressure mixing method (HPMM) set forth in D1, does not seem to lead, without any inventive step, to the method of claim 1 as now amended, or to an epoxy composition as outlined in current claim 20. Furthermore, since current claims 2 to 13 depend on claim 1, and current claims 21 to 25 depend on claim 20, these dependent claims also appear to define new and inventive subject matter as compared to the same prior-art documents. As before the above amendment, claims 14 to 19 tend to set forth a novel and inventive apparatus.

In conclusion, current claims 1 to 25 are believed to comply with Articles 33(2) and 33(3) PCT.

Industrial Applicability - Article 33(4) PCT

Claims 1 to 25 are considered to define subject matter that has industrial applicability under Article 33(4) PCT.

Box No. VII **Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

Figures 9a to 9f were amended under Article 34 PCT on 2 August, 2005. While this amendment is appreciated, these figures are still illegible and do not show the microstructures of the various DGEBA /BF₃MEA systems as required in the description, particularly on page 15.

In addition, claim 1 appears to contain a misprint in the last line of step (b), namely that the term "reduced pressure" occurs as "reduces pressure". Furthermore, in claim 20, the claim number seems to be crossed out by mistake. Another misprint is believed to occur in claim 22, particularly, in the verb "yield" in line 2. The context of this verb appears to suggest that it should occur as "yields" and the respective phrase should read as "a content of clay agglomerates at about 1 wt % of clay loading *yields* an increase".

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 1, 8, 12 and 20 do not comply with Article 6 PCT for the following reasons:

- (A) Claims 1 and 20 do not define the solvent or solvents for the step of "mixing solvents and clay particles ... into a clay solution" (corresponding to step (a) in claim 1). It remains uncertain which solvent is blended with the initial clay particles and whether the pristine epoxy occurs in a solution before it is mixed with the "dispersed clay particles solution".
- (B) As a result of Applicant's amendment dated 2 August 2005, claim 1 does not show the size of the clay particles which are finely and homogeneously distributed. The description teaches, for instance, on page 10 that these particles are nano-dimensional. Since the nano-dimensional character of the clay particles is an essential feature of the present invention, Article 6 PCT is believed to require Applicant to re-enter this feature into claim 1. As it now stands, claim 1 does not seem to have adequate support in the description with regard to the size of the clay particles.
- (C) Claim 8 does not state which particles form the agglomerates of less than 1 micrometer in size. The description leaves no doubt that the agglomerates consist of organoclay nanoparticles. No other agglomerate draws adequate support from the description.
- (D) Claim 12 does not define the "extended period of time". Furthermore, this claim does not identify the "mixture of clay and epoxy obtained" and fails to set forth whether this mixture corresponds to the modified epoxy prepared by the claimed method. Likewise, the claim fails to indicate how the stability of the mixture is established.